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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/728,147	11/28/2000	Paul Nadj	SIA-P032	4966

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EXAMINER

MAHMOUDI, HASSAN

ART UNIT	PAPER NUMBER
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2175

DATE MAILED: 07/08/2004

14

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/728,147

Applicant(s)

NADJ ET AL.

Examiner

Tony Mahmoudi

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 May 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.


DOV POPOVICI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's Request for Continued Examination (RCE) submission filed on 17-May-2004 has been entered. In addition, the "preliminary" amendment filed on 17-May-2004 has been entered for the continued examination of this application.

Remarks

2. In response to communications filed on 17-May-2004, claim 1 is amended per applicant's request. Claims 1-12 are presently pending in the application.

Specification

3. The specification is objected to because the arrangement of the disclosed application does not conform with 37 CFR 1.77(b).

Main section heading appear boldfaced and sub-section headings appear underlined throughout the disclosed specification. Section headings should not be

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underlined and/or **boldfaced**. Appropriate corrections are required according to the guidelines provided below:

4. The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC (See 37 CFR 1.52(e)(5) and MPEP 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text are permitted to be submitted on compact discs.) or
REFERENCE TO A "MICROFICHE APPENDIX" (See MPEP § 608.05(a). "Microfiche Appendices" were accepted by the Office until March 1, 2001.)
- (e) BACKGROUND OF THE INVENTION.
 - (1) Field of the Invention.
 - (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
- (f) BRIEF SUMMARY OF THE INVENTION.
- (g) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
- (h) DETAILED DESCRIPTION OF THE INVENTION.
- (i) CLAIM OR CLAIMS (commencing on a separate sheet).
- (j) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
- (k) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

6. Claims 1-8 and 11 are rejected under 35 U.S.C. 102(e) as being anticipated by Rathbun (U.S. Patent No. 6,138,123.)

As to claim 1, Rathbun teaches a data structure (see column 3, lines 50-53), comprising:

in a heap tree or similar data structure (see column 8, lines 37-40), comprising:

a root level having a node group, the node group having k number of nodes (see figure 30, and see column 19, lines 55-57); and

a second level having one supernode, the supernode having k number of node groups (see figure 33, where “supernode” is illustrated as node A, and node groups illustrated as nodes B and C);

wherein k is at least 4 (see figures 5 and 7-10, and see column 37, line 60 through column 38, line 13.)

As to claim 2, Rathbun teaches the structure further comprising one or more holes in arbitrary leaf positions, the one or more holes representing absent values (see column 8, lines 62-65.)

As to claim 3, Rathbun teaches wherein the k number of node groups are siblings of each other in the heap tree such that only one sibling node is needed for any given path in the heap tree (see figure 65, and see column 11, lines 34-37.)

As to claim 4, Rathbun teaches wherein the arrangement of the supernode in the heap tree allows for speculatively reading a children node in the heap tree before an exact desired child node is known (see column 19, lines 55-57, where “reading children node before an exact child is known” is read on “moving right, traveling down, locating 50 and 70 in order to insert 60” as a child.)

As to claim 5, Rathbun teaches wherein the determination of the exact desired child proceeds in parallel with the retrieval of the supernode (see column 4, lines 21-29.)

As to claim 6, Rathbun teaches the structure further comprising a third level having k number of supernodes (see figure 27, where the “third level having k number of supernodes” is illustrated as node H2.)

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As to claim 7, Rathbun teaches the structure further comprising a remove or delete operation which does not require a last value to be moved into a root node (see figures 9, 10, and 27, and see column 6, lines 49-63, where “remove or delete operation” is read on “remove() function”).)

As to claim 8, Rathbun teaches wherein the remove or delete operation comprises: removing the value from the root node (see column 8, lines 1-10); and percolating the hole associated with the root node down the heap (see column 8, lines 11-15, where “re-ordering data structure” is discussed.)

As to claim 11, Rathbun teaches the structure further comprising an insert operation for percolating a value to be inserted starting at the root level and proceeding towards the bottom level (see figures 4-6, and see column 6, lines 49-63, where “insert operation” is read on “insert() function”).)

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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8. Claims 9-10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rathbun (U.S. patent No. 6,138,123) in view of Klayman (U.S. patent No. 5,463,389.)

As to claim 9, Rathbun does not teach wherein the data structure contains a hole counter that counts the number of holes below the pointer for one or more of the pointers, the hole counter being associated with one or more pointers, the hole counter representing the number of holes in a sub-heap below the one or more pointers.

Klayman teaches a data compression method and device utilizing children arrays (see Abstract), in which he teaches wherein the data structure contains a hole counter that counts the number of holes below the pointer for one or more of the pointers (see column 3, lines 49-53, and see column 6, lines 10-19), the hole counter being associated with one or more pointers (see column 6, lines 53-62, and see column 11, line 62 through column 12, line 1), the hole counter representing the number of holes in a sub-heap below the one or more pointers (see column 8, lines 64-67, where “representing the number of holes in a sub-heap” is read on “child counter is set to a value signifying an empty children array at that node”).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Rathbun to include wherein the data structure contains a hole counter that counts the number of holes below the pointer for one or more of the pointers, the hole counter being associated with one or

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more pointers, the hole counter representing the number of holes in a sub-heap below the one or more pointers.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Rathbun with the teaching of Klayman, because wherein the data structure contains a hole counter that counts the number of holes below the pointer for one or more of the pointers, the hole counter being associated with one or more pointers, the hole counter representing the number of holes in a sub-heap below the one or more pointers, the system can show the number of empty/available cells within the children arrays so that they may get filled with appropriate children of the same root via the insertion operation.

As to claim 10, Rathbun does not teach wherein the remove operation comprises incrementing by one the hole counter associated with each pointer that is traversed.

Klayman teaches a data compression method and device utilizing children arrays (see Abstract), in which he teaches wherein the remove operation comprises incrementing by one the hole counter associated with each pointer that is traversed (see column 3, lines 45-53, where “incrementing the hole counter by 1” is read on “decrementing the child counter of the node”).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Rathbun to include wherein the remove operation comprises incrementing by one the hole counter associated with each pointer that is traversed.

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It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Rathbun with the teaching of Klayman, because wherein the remove operation comprises incrementing by one the hole counter associated with each pointer that is traversed, the system can maintain an accurate count on empty, available, or absent cells as well as an accurate count on the number of children/leaves a root/parent node has at any point in time.

As to claim 12, Rathbun as modified teaches wherein an insert operation comprises: percolating a value to be inserted starting at the root level (see Rathbun, column 19, lines 55-67);

in the one or more pointers, each pointer being associated with a hole counter that tracks the number of available holes, percolating the add value down a node in which the hole counter contains a value greater than zero (see Klayman, column 3, lines 49-53, and see column 6, lines 10-19); and

decrementing the selected hole counter by one (see Klayman, column 3, lines 49-53.)

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Response to Arguments

9. Applicant's arguments filed on 17-May-2004 with respect to the rejected claims in view of the cited references have been fully considered but they are not found to be persuasive:

In response to applicants' argument that "since Rathburn does not recite any examples wherein k must be at least 4, the applicants assert that claim 1 as currently recited is patentable in light of Rathburn", the argument has been fully considered but is not deemed persuasive, because Rathburn illustrates AVL trees with 4 nodes ($k=4$) in figures 4, 7, 9, and 10, as well as trees with 5 nodes ($k=5$), in figure 8. In addition, Rathburn, in column 38, lines 6-13, teaches a scenario where "key is stored on the fourth level down in the B-tree", which indicates that the number of nodes is four.


Conclusion

10. Any inquiries concerning this communication or earlier communications from the examiner should be directed to Tony Mahmoudi whose telephone number is (703) 305-4887. The examiner can normally be reached on Mondays-Fridays from 08:00 am to 04:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dov Popovici, can be reached at (703) 305-3830.

tm

July 2, 2004


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